



Short Communication

Within-person associations between Big Five traits and religiosity

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ABSTRACT

Cross-sectional studies suggest that of the Big Five personality traits, agreeableness and conscientiousness correlate most strongly with religiosity. However, these studies do not provide information about the temporal within-person associations between traits and religiosity. In the present study, the random-intercept cross-lagged panel model was used to examine the temporal within-person associations between traits and religiosity. A large American sample collected over about 2 decades was used. The within-person results showed that religiosity was not predictive of future trait levels. Of the traits, only openness was associated with future religiosity. A higher than typical level of openness was associated with a lower than typical level of religiosity after about a decade.

1. Introduction

A meta-analysis shows that among the Big Five traits (i.e., neuroticism, extraversion, agreeableness, conscientiousness, and openness), agreeableness and conscientiousness correlate most strongly with general religiosity (Saroglou, 2010). A small number of studies have also examined the longitudinal relationship between these variables. For example, a three-wave study (Heaven & Ciarrochi, 2007) with high school students showed that an increase in conscientiousness from time 1 to time 2 was associated with an increase in religiosity at time 3 (only among girls). In a two-wave study, using data from the same project, Huuskos et al. (2013) found that higher religiosity predicted an increase in agreeableness over 2 years. Another two-wave study found that conscientiousness in adolescence significantly predicted religiosity in late adulthood and openness in adolescence predicted late adulthood spiritual seeking (Wink et al., 2007). In the latter study, agreeableness was also found to prospectively predict an increase in religiosity (only among women). Although the results are somewhat contradictory regarding the specific traits that are longitudinally associated with religiosity, in most of these studies, it is the traits that prospectively predicted religiosity. Saroglou, 2009 and Ashton and Lee (2013) reviewed a few existing longitudinal studies (including the studies mentioned above) and reached the same conclusion: Traits are more likely to precede religiosity, and not the other way around.

2. Lack of within-person approach in previous research

Between-person associations are not temporal or directional, they reflect synchronicity and shared causes. Much of what we know about the relationships between traits and religiosity is between-person in nature. A within-person approach requires partitioning variance into between-person and within-person components (Curran & Bauer, 2011). Lagged within-person associations are temporal and directional. That is, they are predictive and between variables measured at two different time points. A significant cross-lagged within-person association means that an increase/decrease from one's typical mean of one variable at time t is associated with an increase/decrease in another variable at time $t + 1$. Within-person associations cannot be examined in cross-sectional studies. Many longitudinal techniques also do not distinguish between within-person and between-person components. The conventional cross-lagged panel model, for example, does not make this distinction (Hamaker et al., 2015). To our knowledge, no previous study has examined the temporal within-person relationship between religiosity and the Big Five traits.

3. The present study

This study sought to address this research gap. The primary purpose was to examine the temporal within-person associations between religiosity and the traits. The Random Intercept Cross-Lagged Panel Model (RI-CLPM; Hamaker et al., 2015) was used, which allows the

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relationship between variables to be examined at both the within-person and between-person levels. Hence, the model is appropriate for answering the within-person question of this study. The study used an American adult sample collected at three time points with lags of about a decade. This long lag is optimal because both traits and religiosity tend to change only over relatively long periods.

4. Methods

4.1. Participants

Wave 1 (collected 1995–1996), Wave 2 (2004–2006), and Wave 3 (2013–2014) data from the Midlife in the United States (MIDUS) study were used (midus.wisc.edu). Because they did not respond to any of the variables during the study period, 653 individuals (9.2 % of all available data) were excluded from the analyses. The final sample consisted of 6455 individuals who provided information on at least one variable across the three waves (age at wave 1, mean = 46.83, SD = 12.93, females = 52.5 %). Of the included participants, 2651 individuals (41.1 %) participated in all three waves, 1514 (23.5 %) in two waves, and 2290 (35.5 %) in only one wave. Thus, 3804 individuals (59 %) missed at least one wave. All research materials and data are publicly available (<http://midus.wisc.edu>).

4.2. Measures

Internal consistencies and descriptive information are shown in Table S1. Measures are provided in the supplementary material.

4.2.1. Personality traits

To assess personality traits, the Midlife Development Inventory (MIDI) personality measure (Lachman & Weaver, 1997) was used (for statistical properties, see Joshanloo, 2018). Respondents indicated how accurately 25 adjectives described them on a scale of 1 = *a lot* to 4 = *not at all* (reverse-coded).

4.2.2. Religiosity

Six items were used to measure religiosity. These items ask respondents about how religious they are, how important religion is in their lives, how important they think religious education is to children, how strongly they identify with their religious group, how much they prefer to be with people of the same religion, and how important they think it is to marry in the same religion. Respondents indicated how well the items described them on a scale of 1 = *very* to 4 = *not at all* (reverse-coded). The items are highly consistent, with Cronbach's alphas above 0.89. Using the first wave data, a principal axis factoring analysis revealed strong support for a unidimensional structure. The first initial eigenvalue was 3.870 and the second initial eigenvalue was 0.804. The proportion of variance in the items explained by a single factor was 57.717 %. Factor loadings ranged from 0.667 to 0.843.

4.3. Statistical analysis

This study used the RI-CLPM, which has recently become one of the most common methods for studying within-person associations (Orth et al., 2022). The RI-CLPM disentangles the between-person and within-person sources of variance. Associations at the between-person level indicate undirected synchronicity, e.g., that high or low values of two variables cooccur. However, cross-lagged associations at the within-person level are directional and indicate whether or not within-person deviations in one variable are associated with within-person deviations in the other variable over time. For example, a significant negative cross-lagged path from a trait to religiosity would mean that a higher than usual value of the trait is associated with a lower than usual value of religiosity at the next time point.

Models were estimated using the robust maximum likelihood

estimator (MLR) in Mplus. A Comparative Fit Index (CFI) of at least 0.90, a Root Mean Square Error of Approximation (RMSEA) of at most 0.07, and a Standardized Root Mean Square Residual (SRMR) of at most 0.08 were used as thresholds for acceptable fit in this study (e.g., Kline, 2015). A Separate RI-CLPM was tested for each personality trait. Religiosity and traits were assessed as manifest variables. Predictive paths between state variables were held equal over time. Of the included participants, approximately 41 % participated in all three waves, and 59 % missed at least one wave. To handle missing data, full information maximum likelihood was used. This estimation strategy uses all available data points and does not omit participants with missing data. In addition, three auxiliary variables were used in all models: baseline age, gender, and a dummy variable indicating the number of missing waves for each participant (0 = individuals with no missing wave and 1 = individuals with at least one missing wave). The auxiliary variables are not key variables in the study. They are included only because they could be associated with the values of the variables with incomplete data. Their use reduces the bias in the parameters that might otherwise occur due to the missing data, thereby increasing the precision of the parameter estimates (Asparouhov & Muthén, 2008; Kline, 2015). For example, if those who dropped out of the study and those who participated in all three waves have different scores on personality traits and religiosity, this difference is accounted for in the estimation to some extent if the number of missing waves is included as an auxiliary variable.

5. Results and conclusion

As shown in Table 1, all models fitted the data very well. The auto-regressive effects from all models are shown in Table 2. All auto-regressive effects are significant, indicating that within-person deviations from typical levels of the variables persist over time. In other words, a higher than typical trait or religiosity value at one point in time is likely to be followed by a higher than typical value for the same variable at the next point in time. The auto-regressive effects are shown in Table 3. There was only one significant auto-regressive effect, the path from openness to religiosity, which was negative. This indicates that higher than usual levels of openness at one time point are associated with lower than usual levels of religiosity at the next time point. In other words, increases in openness are associated with future decreases in religiosity. Based on the effect size guidelines for cross-lagged effects provided by Orth et al. (2022), this effect can be considered small to medium. The R² values for within-person level and between-person correlations are shown in Table 4. At the between-person level, religiosity correlated with all traits except neuroticism. Correlations were positive for extraversion ($r = 0.164$), agreeableness ($r = 0.314$), and conscientiousness ($r = 0.105$) and negative for openness ($r = -0.066$).

In summary, the results show that deviations from the typical value of one's religiosity are not associated with future deviations in personality traits. Within-person deviations in neuroticism, extraversion, agreeableness, and conscientiousness also do not predict future

Table 1
Fit indices.

Model	X ²	df	p	RMSEA [90 % CI]	CFI	SRMR
Neuroticism	43.034	5	0.000	0.034 [0.025, 0.044]	0.996	0.028
Extraversion	45.821	5	0.000	0.036 [0.027, 0.045]	0.996	0.034
Agreeableness	37.530	5	0.000	0.032 [0.023, 0.042]	0.996	0.030
Conscientiousness	41.052	5	0.000	0.033 [0.024, 0.043]	0.995	0.037
Openness	46.596	5	0.000	0.036 [0.027, 0.046]	0.995	0.032

Table 2
Auto-regressive coefficients.

Predictor	Outcome	Unstandardized coefficient	p	95 % CI		Standardized coefficient
				Low	Up	
Neuroticism						
N1	N2	0.158	0.000	0.084	0.232	0.179
N2	N3					0.160
R1	R2	0.530	0.000	0.454	0.606	0.439
R2	R3					0.534
Extraversion						
E1	E2	0.195	0.000	0.109	0.281	0.178
E2	E3					0.203
R1	R2	0.527	0.000	0.451	0.603	0.437
R2	R3					0.531
Agreeableness						
A1	A2	0.168	0.000	0.087	0.249	0.158
A2	A3					0.174
R1	R2	0.528	0.000	0.453	0.604	0.437
R2	R3					0.532
Conscientiousness						
C1	C2	0.191	0.000	0.099	0.283	0.179
C2	C3					0.185
R1	R2	0.528	0.000	0.451	0.604	0.437
R2	R3					0.532
Openness						
O1	O2	0.257	0.000	0.165	0.349	0.237
O2	O3					0.261
R1	R2	0.527	0.000	0.450	0.603	0.436
R2	R3					0.530

Note. R = religiosity.

Table 3
Cross-lagged coefficients.

Predictor	Outcome	Unstandardized coefficient	p	95 % CI		Standardized coefficient
				Low	Up	
Neuroticism						
R1	N2	-0.014	0.660	-0.077	0.049	-0.015
R2	N3					-0.018
N1	R2	-0.010	0.714	-0.063	0.043	-0.009
N2	R3					-0.008
Extraversion						
R1	E2	0.045	0.106	-0.009	0.099	0.051
R2	E3					0.065
E1	R2	0.018	0.625	-0.054	0.090	0.012
E2	R3					0.013
Agreeableness						
R1	A2	0.025	0.302	-0.022	0.072	0.031
R2	A3					0.038
A1	R2	0.042	0.242	-0.028	0.112	0.026
A2	R3					0.028
Conscientiousness						
R1	C2	-0.014	0.553	-0.061	0.033	-0.019
R2	C3					-0.022
C1	R2	-0.019	0.635	-0.097	0.059	-0.011
C2	R3					-0.012
Openness						
R1	O2	-0.043	0.098	-0.094	0.008	-0.051
R2	O3					-0.062
O1	R2	-0.082	0.027	-0.154	-0.009	-0.053
O2	R3					-0.058

Note. R = religiosity.

deviations in religiosity. The only significant cross-lagged path was from openness to religiosity, indicating that an increase in openness is associated with a future decrease in religiosity. These results are consistent with the conclusions of Saroglou, 2009 and Ashton and Lee (2013) that changes in religiosity do not precede changes in personality traits. While the cross-sectional literature has highlighted agreeableness and conscientiousness as the most important correlates of religiosity (Saroglou, 2010), the current within-person findings draw attention to openness as the only trait that precedes religiosity. It is worth noting that Ashton and

Lee's (2019) facet-level analysis showed that religiosity can be differently associated with facets that relate to a broad personality trait. For example, the study found that out of over 20 personality facets, religiosity was more strongly associated with some facets such as fairness, forgiveness, and sentimentality. Thus, for a more comprehensive description of the temporal within-person associations between personality and religiosity, future longitudinal studies would also need to examine associations at the facet level.

Table 4
R² values and between-person correlations.

Model	R ²				Correlation with religiosity
	Religiosity		Personality		
	Wave 2	Wave 3	Wave 2	Wave 3	
Neuroticism	0.193	0.285	0.032	0.026	−0.032
Extraversion	0.191	0.283	0.035	0.047	0.164***
Agreeableness	0.193	0.286	0.026	0.033	0.314***
Conscientiousness	0.191	0.283	0.032	0.035	0.105***
Openness	0.193	0.288	0.058	0.074	−0.066**

Note. R² values are for the within-person part of the RI-CLPMs. Correlations are the standardized between-person covariances between trait components.

** $p < .01$.

*** $p < .001$.

CRedit authorship contribution statement

Mohsen Joshanloo: Conceptualization, Formal analysis, Writing – original draft, Writing – review & editing.

Data availability

Data and materials are publicly available. For more information, visit <https://midus.wisc.edu>.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.paid.2022.111912>.

References

- Ashton, M. C., & Lee, K. (2013). Personality and religiousness. In V. Saroglou (Ed.), *Religion, personality, and social behavior* (pp. 31–45). New York: Psychology Press.
- Ashton, M. C., & Lee, K. (2019). Religiousness and the HEXACO personality factors and facets in a large online sample. *Journal of Personality*, 87(6), 1103–1118. <https://doi.org/10.1111/jopy.12459>
- Asparouhov, T., & Muthén, B. (2008). *Auxiliary Variables Predicting Missing Data*. Retrieved from <https://www.statmodel.com/download/AuxM2.pdf>.
- Curran, P. J., & Bauer, D. J. (2011). The disaggregation of within-person and between-person effects in longitudinal models of change. *Annual Review of Psychology*, 62(1), 583–619. <https://doi.org/10.1146/annurev.psych.093008.100356>
- Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. P. G. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, 20(1), 102–116. <https://doi.org/10.1037/a0038889>
- Heaven, P. C. L., & Ciarrochi, J. (2007). Personality and religious values among adolescents: A three-wave longitudinal analysis. *British Journal of Psychology*, 98(4), 681–694. <https://doi.org/10.1348/000712607x187777>
- Huuskes, L., Ciarrochi, J., & Heaven, P. C. L. (2013). The longitudinal relationships between adolescent religious values and personality. *Journal of Research in Personality*, 47(5), 483–487. <https://doi.org/10.1016/j.jrp.2013.04.010>
- Joshanloo, M. (2018). Evaluating the factor structure of the MIDI personality scale using exploratory structural equation modeling. *Japanese Psychological Research*, 60(3), 162–169. <https://doi.org/10.1111/jpr.12186>
- Kline, R. B. (2015). *Principles and practice of structural equation modeling*. New York: Guilford.
- Lachman, M. E., & Weaver, S. L. (1997). *The Midlife Development Inventory (MIDI) personality scales: Scale construction and scoring*. Waltham, MA: Brandeis University. <https://www.brandeis.edu/psychology/lachman/pdfs/midi-personality-scales.pdf>.
- Orth, U., Meier, L. L., Bühler, J. L., Dapp, L. C., Krauss, S., Messerli, D., & Robins, R. W. (2022). Effect size guidelines for cross-lagged effects. *Psychological Methods*. <https://doi.org/10.1037/met0000499>. Advance online publication.
- Saroglou, V. (2009). Religiousness as a cultural adaptation of basic traits: A five-factor model perspective. *Personality and Social Psychology Review*, 14(1), 108–125. <https://doi.org/10.1177/1088868309352322>
- Saroglou, V. (2010). Religiousness as a cultural adaptation of basic traits: A five-factor model perspective. *Personality and Social Psychology Review*, 14(1), 108–125. <https://doi.org/10.1177/1088868309352322>
- Wink, P., Ciciolla, L., Dillon, M., & Tracy, A. (2007). Religiousness, spiritual seeking, and personality: Findings from a longitudinal study. *Journal of Personality*, 75(5), 1051–1070. <https://doi.org/10.1111/j.1467-6494.2007.00466.x>